

An object moves along the x-axis so that its position at any time $t \geq 0$ is given by

$$\mathbf{x(t) = \cos (t^2 + 1).}$$

Find the velocity of the object as a function of t .

$$\begin{aligned} v(t) &= x'(t) \\ &= -\sin(t^2 + 1) \cdot 2t \\ &= -2t \sin(t^2 + 1) \end{aligned}$$

a.) Find the slope of the line tangent to the curve $y = \sin^5 x$ at the point where $x = \pi/3$

b.) Show that the slope of every line tangent to the curve $y = 1/(1 - 2x)^3$ is positive.

$$y = (1 - 2x)^{-3}$$

$$y' = -3(1 - 2x)^{-4}(-2)$$

$$= \frac{6}{(1 - 2x)^4}$$

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